



## Quantifying the effects of climate variability and human activities on runoff for Kaidu River Basin in arid region of northwest China

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### Abstract:

Much attention has recently been focused on the effects that climate variability and human activities have had on runoff. In this study, data from the Kaidu River Basin in the arid region of northwest China were analyzed to investigate changes in annual runoff during the period of 1960-2009. The nonparametric Mann-Kendall test and the Mann-Kendall-Sneyers test were used to identify trend and step change point in the annual runoff. It was found that the basin had a significant increasing trend in annual runoff. Step change point in annual runoff was identified in the basin, which occurred in the year around 1993 dividing the long-term runoff series into a natural period (1960-1993) and a human-induced period (1994-2009). Then, the hydrologic sensitivity analysis method was employed to evaluate the effects of climate variability and human activities on mean annual runoff for the human-induced period based on precipitation and potential evapotranspiration. In 1994-2009, climate variability was the main factor that increased runoff with contribution of 90.5 %, while the increasing percentage due to human activities only accounted for 9.5 %, showing that runoff in the Kaidu River Basin is more sensitive to climate variability than human activities. This study quantitatively distinguishes the effects between climate variability and human activities on runoff, which can do duty for a reference for regional water resources assessment and management.

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### Resource Description

#### Exposure :

weather or climate related pathway by which climate change affects health

Extreme Weather Event

**Extreme Weather Event:** Flooding

#### Geographic Feature:

resource focuses on specific type of geography

Freshwater, Other Geographical Feature

**Other Geographical Feature :** River basin

#### Geographic Location:

resource focuses on specific location

# Climate Change and Human Health Literature Portal

Non-United States

**Non-United States:** Asia

**Asian Region/Country:** China

**Health Impact:** ☒

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

**Resource Type:** ☒

format or standard characteristic of resource

Research Article

**Timescale:** ☒

time period studied

Time Scale Unspecified